

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

1977

UPPER COOK INLET AREA  
REGION II

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## PREFACE

The purpose of this report is to present the management aspects of the fisheries under the control of the Upper Cook Inlet management area. This includes all fisheries in Cook Inlet north of the latitude of Anchor Point and the herring fishery for the entire Cook Inlet area. Field operations and research aspects of the management area are not presented here as they are adequately covered in the technical reports produced by the research section.

Please note that all statistical data presented here relating to the 1977 season is preliminary and subject to change (probably minor) at a later date.

## INTRODUCTION

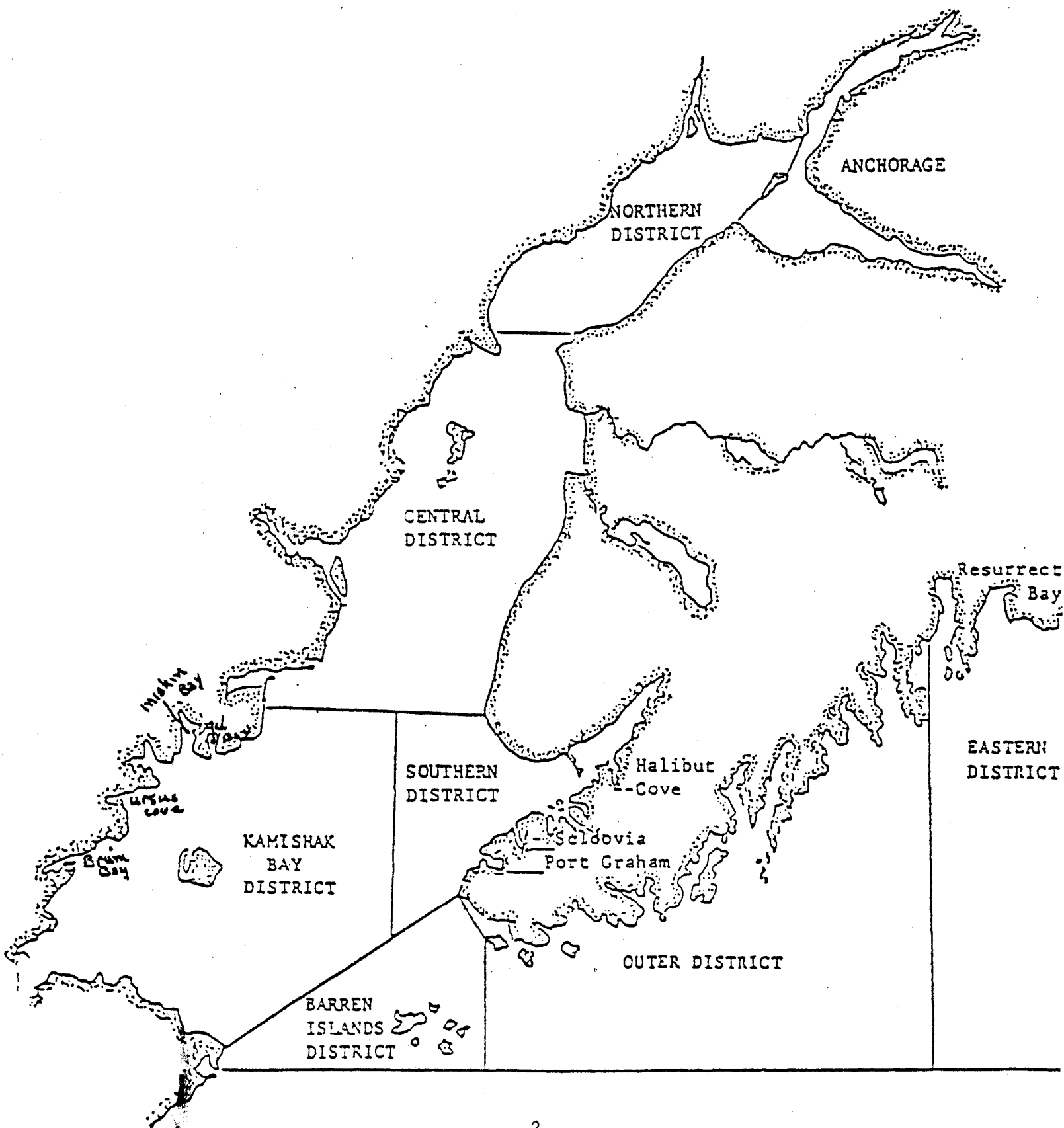
Cook Inlet (Figure 1) is split into two management areas, Upper Cook Inlet which is all waters north of the latitude of Anchor Point, and Lower Cook Inlet which encompasses the rest. This report will deal with all the fisheries in the Upper Cook Inlet area and the herring fishery in Lower Cook Inlet.

Upper Cook Inlet (Figure 2) is divided into two districts, Northern and Central. The Central district is subdivided into six subdistricts. The area is characterized by extremely roily water and tremendous tidal currents and fluctuations. This makes gillnets about the only practical gear for fishing pelagic species such as salmon and herring, now that traps are outlawed, and except for Chinitna Bay where seines are allowed for salmon, gillnets are the only legal gear here.

Salmon is far and away the major fishery in Upper Cook Inlet. This fishery began in 1882 and has run continuously ever since. The fishery currently runs from late June thru September. The harvest averages between 2 million and 4 million fish which is 5% to 8% of the statewide harvest. About 1200 permit holders participate in the fishery which is about 14% of the statewide effort. The runs are usually stronger on even years mainly because the pink salmon are on an even year cycle although chum and coho also tend to run stronger on even years also. The 1977 season had the best odd year harvest on record. Over 4 million salmon were harvested worth close to \$20 million to the fishermen.

The herring fishery in Upper Cook Inlet is currently restricted to a small set gillnet operation located on the upper east side of the Central district. This is a very new fishery having first started in 1973. It takes place during May when the herring move into spawn. Because the quality

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COOK INLET - RESURRECTION BAY AREA



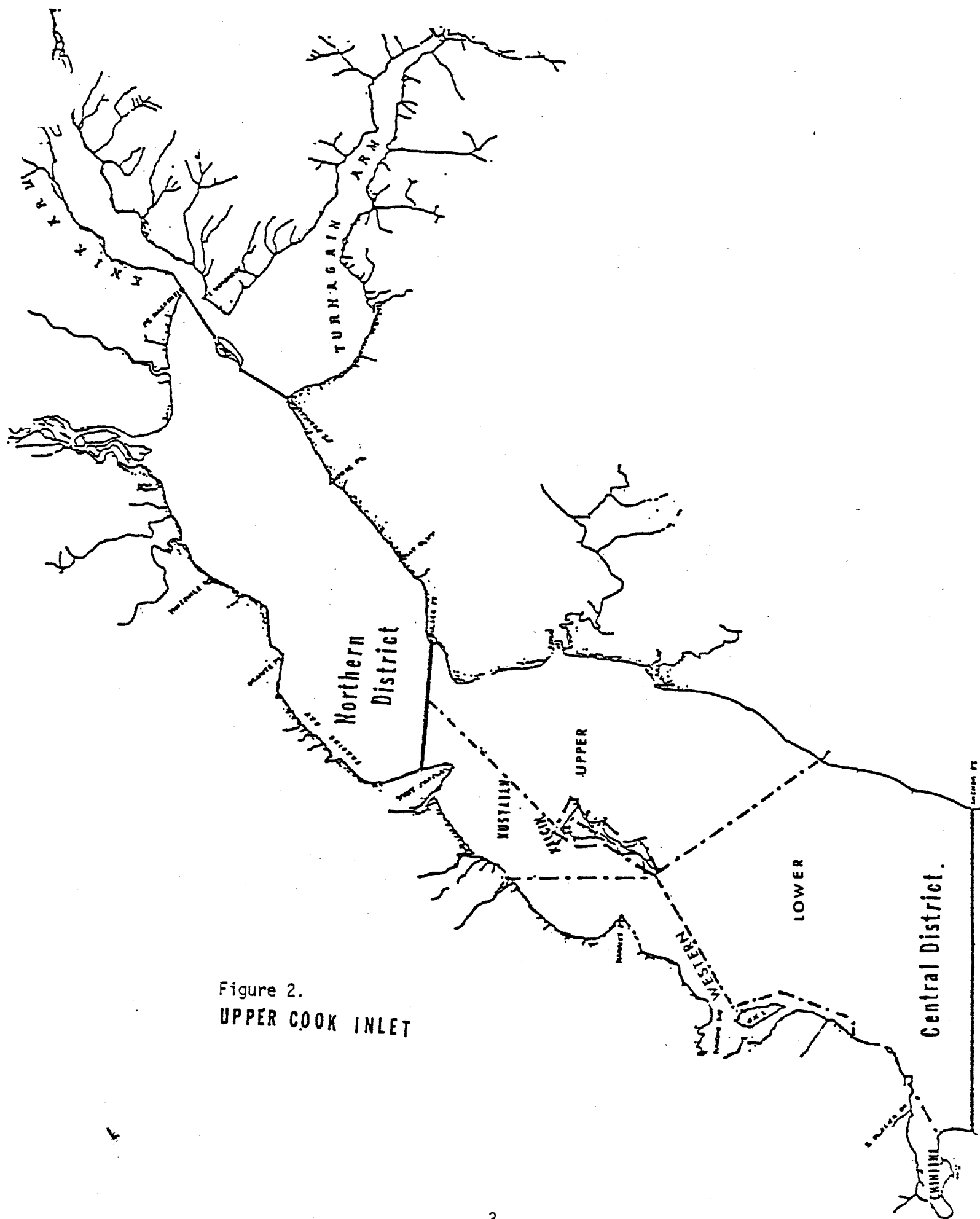


Figure 2.  
UPPER COOK INLET

of the herring taken here is not sufficient for roe, the catch is used almost exclusively for bait. The average annual harvest is about 10 tons. In 1977 the harvest was 17 tons worth about \$4,000 to the fishermen.

The only other fishery in the upper Inlet aside from a small halibut fishery is an on again-off again razor clam fishery which has been going on since the 1920's. Currently it is off, although there have been attempts by several individuals to get a dredging operation going.

There are subsistence fisheries in the upper area on all the species mentioned here plus smelt. None of these fisheries are currently very significant.

The herring fishery in Lower Cook Inlet is of major proportions. It is a purse seine fishery with about 60 seiners participating. Presently the fishery is located almost exclusively in the Kamishak district although the Southern district harvest should begin to increase as herring stocks become more available there. The fishery has a guideline harvest level of 4,000 tons. In 1977 the 3,157 ton harvest was worth about \$1.25 million to the fishermen.

The following section is a detailed discussion of these fisheries with historical background and a review of the management during the 1977 season.

## SALMON FISHERY

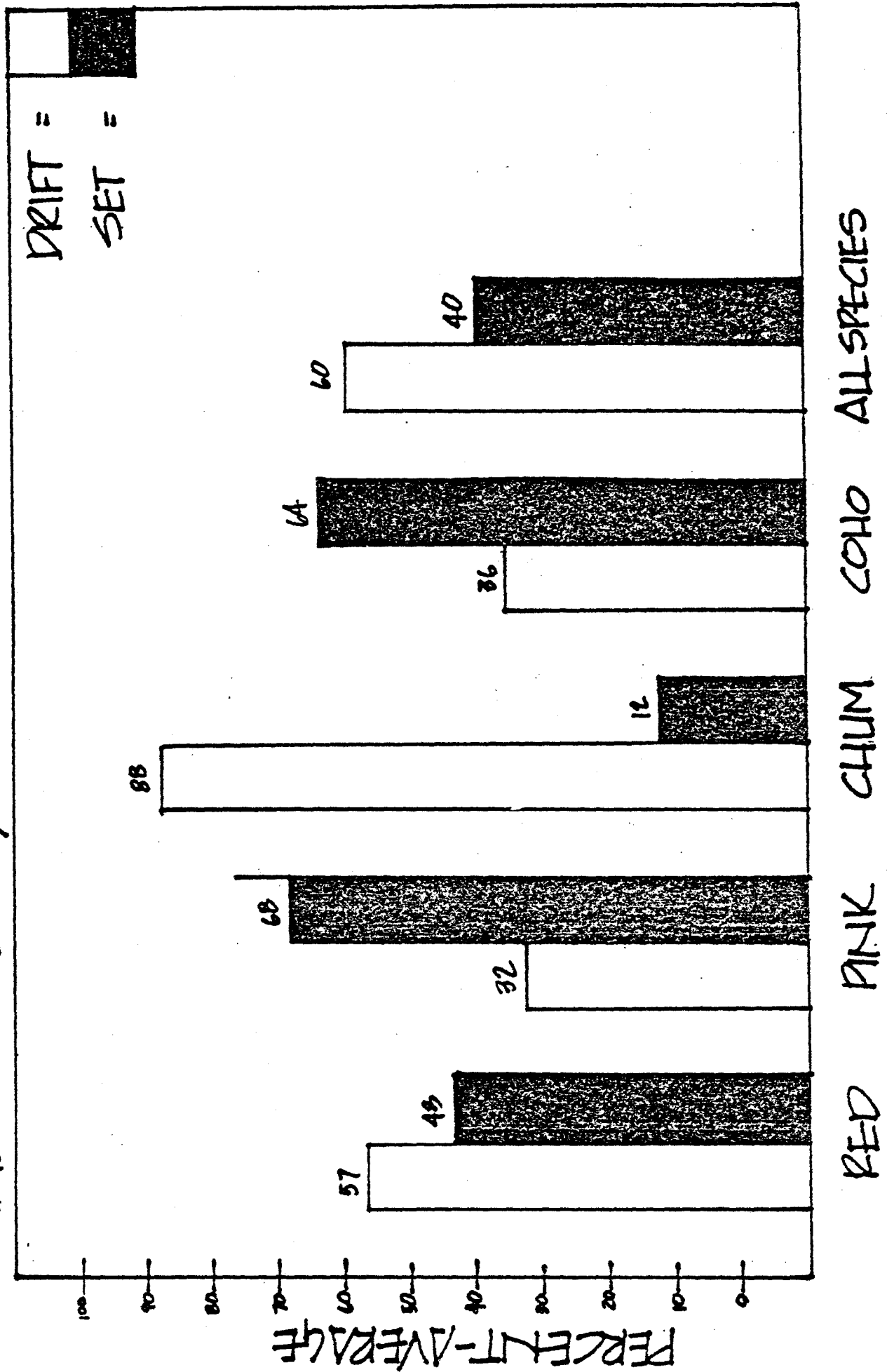
### INTRODUCTION

Organized commercial fishing began in Cook Inlet in the early 1880's. From its inception through the mid-1940's, traps and set gillnets were the only gear used, with traps accounting for the majority of the catch. However, with the use of synthetic fibers to produce more durable gillnets, the inception of the drift fleet in the late 1940's and the subsequent decrease in fishing time, the influence of traps began to wane. By the time traps were outlawed in 1959 they were accounting for less than 16% of the salmon harvest.

Set and drift gillnets are quite different in their manner of fishing and their effectiveness. The drift gillnet fleet can function anywhere within the confines of the Central district. This enhances the manageability of drift nets in that they can be moved on or off concentrations of fish as conditions warrant. Set gillnets on the other hand are stationary gear and can only be fished on stocks which migrate past their specific location.

Set gillnets have been in the commercial fishery since its inception. Prior to the mid-1940's their contribution to the commercial harvest was minimal. The problem was materials used to make the nets and hold them in place did not stand up well in the strong currents and they were difficult to tend. Synthetic materials developed in the late 1930's and early 1940's enabled set gillnets to better fish the area and the development of more powerful and reliable outboard motors after World War II made tending the nets a much easier task. Consequently, set nets began to take an increasing share of the harvest. By the time traps were outlawed, set gillnets were outfishing them almost 2 to 1. There are currently about 677 set gillnet permits for the Upper Cook Inlet area and since 1966 they have taken an average of 43% of the total salmon harvest (Figure 3).

FIGURE 3. 1966-77 UPPER LOOK INLET  
 TWELVE YEAR AVERAGE = PERCENT CATCH  
 BY GEAR BY SPECIES/ALL SPECIES



Set gillnets are located along almost the entire periphery of the area and are legal gear in both the Central and Northern districts. However, since migrating salmon are not dispersed equally in all areas of the Inlet, some sites are better for set gillnetting than others and consequently the distribution of gear is uneven.

Prior to 1947, the maximum length for set gillnets was 100 fathoms and most fishermen would fish four 25 fathom units. With the development of better gear, fishermen found they could more efficiently fish longer nets. To allow for this change, the regulations were altered in 1947 to allow a maximum aggregate of 105 fathoms with no single net being longer than 35 fathoms, and this regulation prevails today.

Drift gillnetting was never illegal and drifting was attempted intermittently since the 1920's. However, prior to 1947 drift gear was limited to 100 fathoms, the same as set nets, which apparently wasn't enough to make it worthwhile. In 1947 the regulations were changed to allow drift gillnetting with up to 200 fathoms of net. This change apparently made drifting feasible as participation and catch increased from that point onward. In 1949 the amount of gear allowed was reduced to 150 fathoms, which is the legal limit today. Drift gillnetting is allowed only in the Central district.

The success of drift gillnet fishing was phenomenal. By 1950, three years after its inception, drift gear accounted for slightly over 50% of the catch and it has never given up its position of prominence. Today there are 545 drift gillnet permits for Cook Inlet and since 1966 they have taken an average of 57% of the salmon catch (Figure 3). Also included is Figure 4 which describes catch by species by area for the gillnet districts.

The introduction of drift gear into the Upper Cook Inlet fishery necessitated radical management changes. This very efficient gear was introduced into a fishery that was already adequately harvesting the runs. As a result,

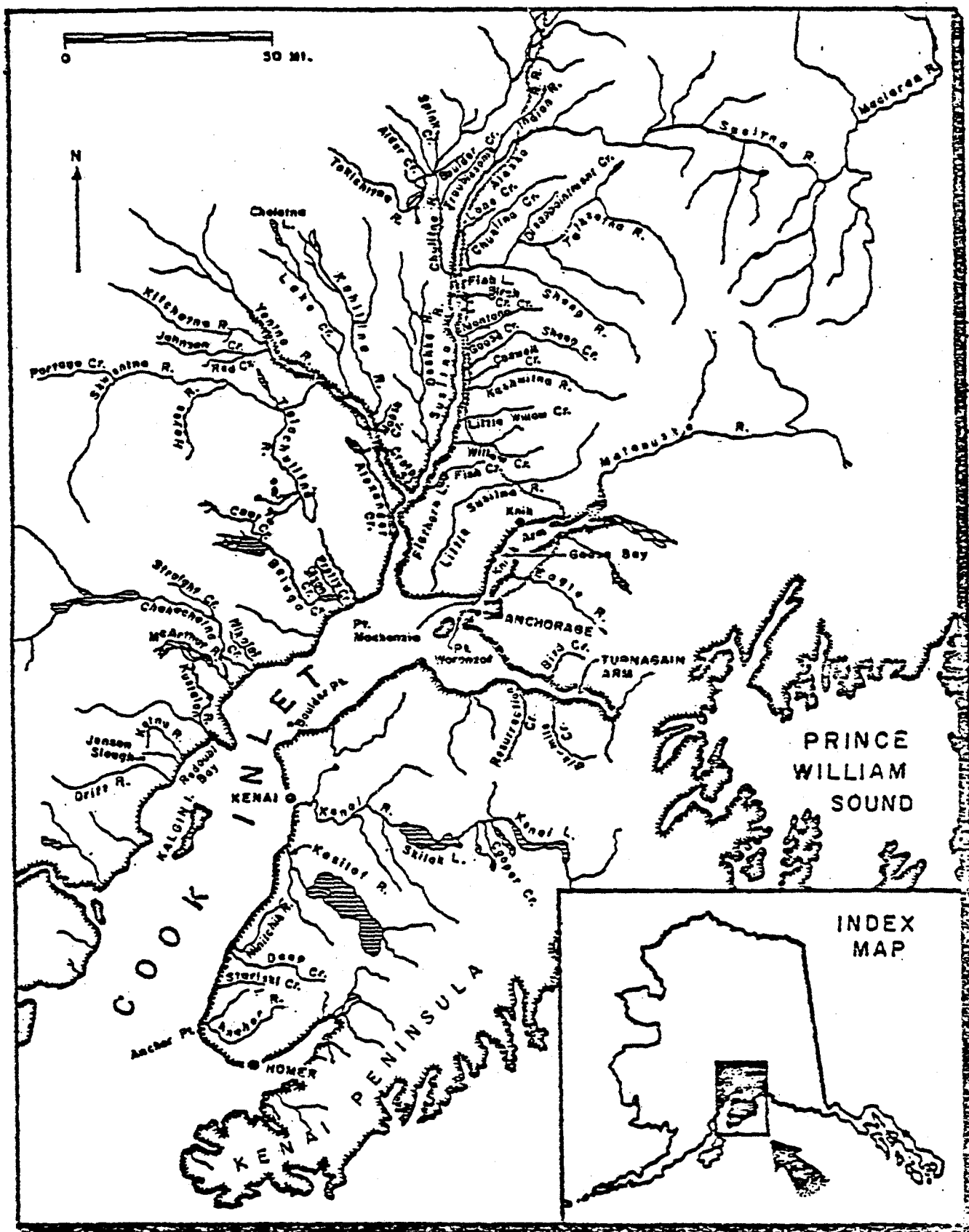


Figure 4 -Cook Inlet, Alaska, showing streams where major salmon runs occur.

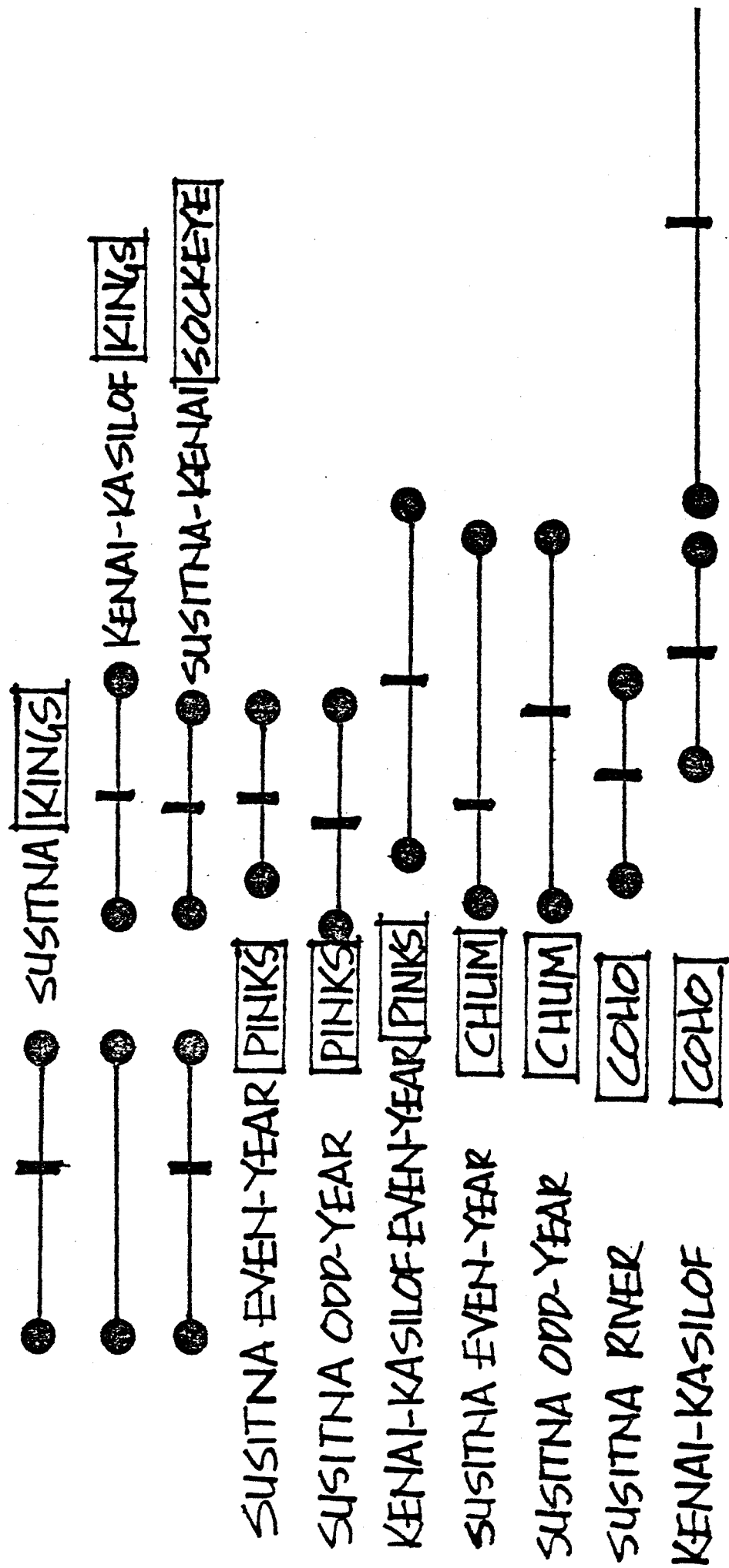
a sharp reduction in fishing time has occurred through the years to offset this increasing catch efficiency and prevent overharvesting of the stocks. Current regulations establish a weekly schedule of two 12-hour periods per week. This amount of time is the minimum necessary to assess strength and timing of various salmon runs. Fishing time is increased if stock abundance warrants, and decreased if necessary. Lack of escapement information in most of Cook Inlet creates a dependence upon catch data for inseason management.

The bulk of the salmon pass through the Upper Cook Inlet from May through September to reach their freshwater spawning streams. The location of the major spawning streams is shown in Figure 4. The largest portion of the run occurs during July. Figure 5 depicts the timing of major runs through the Inlet. King salmon are the first species to enter the Inlet and are the least abundant. Recent catches do not adequately reflect total abundance of king salmon at present. The Susitna run begins about the latter part of May, peaks the second week in June, and is usually over by June 25. This is the largest king salmon run in the Inlet. The second largest producer is the Kenai River. Timing of the main, or late, Kenai run overlaps that of other species to a much greater degree, beginning the first week in July, peaking around the 20th of July, and ending the first week in August.

Sockeye salmon are the most consistently abundant species and the mainstay of the commercial fishery. In order of importance, the main sockeye producers in Cook Inlet are the Kenai, Susitna, and Kasilof River systems.

Many minor systems produce sockeye on the west side of Cook Inlet, the upper part of Knik Arm, and on the Kenai Peninsula. Run timing is characterized by two general time periods. The first run partially overlaps the early Susitna and early Kenai king salmon runs, beginning in late May, peaking in

FIGURE 5. GENERAL COOK INLET SALMON RUN TIMING SCHEMATIC



mid-June, and over by the latter part of June. This run is insignificant in numbers compared to the later run. The main runs destined for the Susitna/Kenai/Kasilof rivers begins in early July, peaks between July 15 and 20, and are over by the first week in August.

Pink salmon are the second most abundant species, with a predominately even-year run. Until recently, the odd-year run has been one of the least abundant species in the commercial fishery. The Susitna is the most important spawning area for pink salmon in Cook Inlet, with the Kenai and Kasilof second. The timing of pink salmon runs varies between the Susitna and the Kenai/Kasilof rivers.

The even-year run to the Susitna begins about July 10, peaks around July 20, and is over by August 1. The odd-year run to the Susitna, which has increased significantly since 1971, is about seven days earlier than the even-year run. The even-year run to the Kenai/Kasilof rivers (there is no significant odd-year run) begins about July 15, peaks around August 3, and is essentially over by August 18. It is, therefore, about two weeks later than the even year Susitna run.

Chum salmon are the third most abundant species in the commercial harvest and second to the sockeye salmon in economic importance. The Susitna River system is the primary spawning area for chums, with secondary production coming from the west side and Chinitna Bay. The Susitna run begins about July 8, peaks in mid-July on even years, the end of July on odd years, and is over by August 15.

Coho salmon spawn in many streams around the entire periphery of the gillnet districts. The three major spawning areas in order of importance are the Susitna-Little Susitna drainage, the Kenai-Kasilof rivers, and the west side of the Central district. Susitna Basin stocks return the earliest, beginning about July 10 in the gillnet district, peaking about July 20, and

over by early August. Kenai-Kasilof stocks run in two segments; the first one begins about July 20, peaks during the first week in August and tapers off around mid-August. The second segment begins about the third week in August, peaks during the second week in September, and tapers off into October.

The commercial fishery can be characterized as being less dependent on any particular species or time of fishing than it is on the total value of the catch and the cost to harvest it. It is also less limited by access to the total resource than is the recreational fishery. This is not completely true of the entire commercial user group, because set nets are limited to the portion of the resource that migrates past their site, whereas the drift fishermen have access to any runs migrating through the Central district unless certain areas are closed by regulation.

Since 1960 the catch has average 2.8 million salmon annually (Table 1). Because pink salmon, and to a lesser degree coho and chum, run stronger on even years, the even year catch has averaged 3.7 million and the odd year catch 2.0 million.

1977 Commercial Fishery. - The salmon harvest in 1977 was one of the best odd year harvests ever experienced in the Upper Cook Inlet area. The sockeye run produced a catch of over two million, the highest since 1951. The coho harvest of 187,000 was above the odd year average of 151,000. The pink run produced a record odd year harvest of 545,000 and the chum run produced a record catch of 1.25 million. The effort this year was close to the maximum of 545 units of drift gillnet gear and about 670 units of set gillnet gear.

The bulk of the management this year centered around attempts to implement the Board of Fisheries directive to maximize escapement of the coho run. This run is bound mainly for the Susitna River. The base fishing time of two 12 hour periods per week and/or the normal fishing areas were altered by

Table 1. Cook Inlet gillnet districts salmon catch, 1960-1977.

Year	King	Sockeye	Coho	Pink	Chum	Total
1960	27,512	933,539	311,502	1,423,699	659,997	3,356,200
1961	19,737*	1,162,303	117,778	34,017	349,628	1,683,463
1962	20,210	1,147,573	350,324	2,711,689	1,007,934	5,237,730
1963	17,536	942,980	197,140	30,436	387,027	1,575,119
1964	4,531	970,055	453,641	3,231,961	1,079,086	5,739,274
1965	9,741**	1,412,187	153,469	23,897	316,313	1,915,607
1966	8,525	1,852,449	289,903	2,006,376	532,821	4,690,074
1967	7,859	1,380,062	177,729	32,229	296,837	1,894,716
1968	4,536	1,104,896	468,760	2,276,993	1,107,903	4,963,088
1969	12,398	692,254	100,952	33,422	269,855	1,108,881
1970	7,947	729,034	271,910	777,526	775,959	2,562,012
1971	19,765	636,303	100,636	35,624	327,029	1,119,357
1972	16,086	879,824	80,933	628,580	630,148	2,235,571
1973 <sup>1/</sup>	5,194***	670,025	104,420	326,184	667,573	1,773,396
1974	6,671	524,181	203,135	494,827	399,553	1,628,467
1975 <sup>2/</sup>	4,790	685,818	227,372	336,359	951,796	2,206,135
1976 <sup>2/</sup>	10,200	1,644,000	217,000	1,259,000	474,000	3,604,200
1977	13,300	2,025,000	187,000	546,000	1,249,000	4,020,300
Average all years	8,031	1,077,360	222,827	900,038	617,972	2,824,722
Average even years			294,123	1,645,950	740,600	3,708,415
Average odd years			151,791	154,867	535,617	1,982,302

<sup>1/</sup> First year of fishing only on late king salmon run. Average last five years only.

<sup>2/</sup> Preliminary figures.

\* Opening date moved from late May to end of first week in June.

\*\* Opening date moved to third week in June.

\*\*\* Opening date moved to late June in Central, early July in Northern district.

emergency order on 14 occasions this year. The bulk of these were designed to protect Northern district coho while allowing the harvest of other species. Table 2 gives a brief description of each emergency order. Table 3 gives the 1977 catch by species by period for the entire Upper Cook Inlet area combined.

The season opened on June 27, and 43,000 sockeye were taken on that first period. In view of the large number taken and the desire to get ahead on the sockeye harvest as much as possible, an extra period was held on June 29. Fifty-two thousand sockeye were taken during this period, a very good catch for that time of year. The regular period on July 1 had a catch of 65,000 sockeye, again quite good. Very few other species were being taken at this time. During the regular period on Monday July 4, 80,000 sockeye were taken. Although sockeye escapements into the Kenai and Kasilof were progressing normally at this point and the catches were quite good, we had no indication of the total magnitude of this run. The bulk of the catch on July 4 came from the drift fleet located in the Southern end of the inlet and set gillnets on the lower east side with catches from the northern part actually being below normal for that time of year. Although there was interest in harvesting as many sockeye as possible before the coho arrived, the possibility of overdoing it and damaging the sockeye runs particularly to the Kasilof and Susitna systems which peak a little earlier than the Kenai became the overriding concern. In view of this no fishing was allowed until the regular period on July 8.

The sockeye catch from the July 8 period was 195,000, double the July 4 catch. Pinks and chums also began to show up in significant numbers at this time, but the coho catches remained insignificant. During the next period, July 11, the peak sockeye harvest of 355,000 occurred, with the majority of the catch from the fleet. The coho catch still remained low. In view of the large sockeye catch and good escapement it was decided to hold an extra period on Wednesday, July 13. The catch of 349,000 sockeye

Table 2.

1977 EMERGENCY ORDER SUMMARY  
UPPER COOK INLET AREA  
SALMON

Base time - two 12 hour periods per week 6:00 a.m. to 6:00 p.m. Monday and Friday. For location of boundaries mentioned here see map Figure 6.

Emergency Order Number	Date	Description
25-7-77	6/29	Open entire Central district for 12 hour period 6:00 a.m. to 6:00 p.m. to harvest sockeye.
25-8-77	7/6	Open Western subdistrict of Central district for 12 hour period 6:00 a.m. to 6:00 p.m. to harvest Crescent River sockeye.
25-9-77	7/13	Open Central district for 12 hour period 6:00 a.m. to 6:00 p.m. to harvest Crescent River and Kenai-Kasilof sockeye.
25-10-77	7/16	Open Upper subdistrict of Central district to set gillnet fishing and east side of Central district east of a line three to four miles from shore between Nikiski dock and Ninilchik to drift gillnets for 16 hour period. 6:00 a.m. to 10:00 p.m. to harvest Kenai-Kasilof sockeye while protecting Northern district coho stocks.
25-11-77	7/18	Restrict drift fleet for six hours during regular 12 hour fishing period. to area east of a line three to four miles from shore between Nikiski dock and Ninilchik to give extra protection to Northern district coho stocks.
25-12-77	7/20	Open Upper subdistrict of Central district to set gillnets and the Central district south of the latitude of the Clam Gulch radio tower to drift gillnets for a 12 hour period 6:00 a.m. to 6:00 p.m. to harvest Kenai-Kasilof sockeye while protecting Northern district coho stocks.
25-12A-77	7/20	Open Upper subdistrict to set gillnets for additional four hours to 10:00 p.m. and east side of Central district east of a line three to four miles from shore between Nikiski dock and Ninilchik for ten hours 12 noon to 10:00 p.m. to harvest sockeye near the mouths of the Kenai-Kasilof rivers.
25-13-77	7/21	Open Upper subdistrict of Central district and east side of Northern district from Boulder Point to Point Possession to set gillnets and east side of Central district east of a line three to six miles from shore between Nikiski dock and Ninilchik to drift gillnets for 16 hours 6:00 a.m. to 10:00

Table 2. (cont.)

1977 EMERGENCY ORDER SUMMARY  
UPPER COOK INLET AREA  
SALMON

Emergency Order Number	Date	Description
		p.m. to harvest Kenai-Kasilof sockeye while protecting Northern district coho stocks.
25-14-77	7/22	Close Upper subdistrict of Central district to set gillnets and entire Central district to drift gillnets during regular 12 hour period to allow for a more thorough evaluation of the catch by this gear during the previous two periods before allowing more time.
25-15-77	7/23	Open Upper subdistrict of Central district and east side of Northern district from Boulder Point to Point Possession to set gillnets for 16 hour period 6:00 a.m. to 10:00 p.m. and east side of Central district east of a line three to six miles from shore between Nikiski dock and Ninilchik for four hours 6:00 a.m. to 10 a.m. and the entire Central district east of the mid rip for 12 hours 10:00 a.m. to 10:00 p.m. to harvest Kenai-Kasilof sockeye and Northern district chums while protecting Northern district coho stocks.
25-16-77	7/24	Open up Upper subdistrict of Central district and east side of Northern district from Boulder Point to Point Possession to set gillnets and east side of Central district east of a line three to six miles from shore between Nikiski dock and Ninilchik to drift gillnets for 16 hours 6:00 a.m. to 10:00 p.m. to harvest Kenai-Kasilof sockeye while protecting Northern district coho stocks.
25-17-77	7/25	Close west side of Northern district from West Foreland to Point McKensie including Fire Island and restrict drift fleet to area south of line between Cape Kasilof and southern tip of Kalgin Island during regular 12 hour period to protect Northern district coho stocks.
25-18-77	8/10	Open Kustatan, Kalgin Island, Western and Chinitna Bay subdistricts of the Central district and Northern district except east side from Boulder Point to Point Possession to set gillnets and entire Central district to drift gillnets for 12 hour period 6:00 a.m. to 6:00 p.m. to harvest chum salmon.
25-19-77	8/13	Open entire Central district to drift gillnets and Kustatan, Kalgin Island, Western and Chinitna Bay subdistricts of the Central district and west side

Table 2. (cont.)

1977 EMERGENCY ORDER SUMMARY  
UPPER COOK INLET  
SALMON

Emergency Order Number	Date	Description
		of the Northern district from West Foreland to Susitna River to set gillnets for three 12 hour periods per week 6:00 a.m. to 6:00 p.m. Monday, Wednesday, and Friday until further notice to harvest chums and late run west side coho. Set gillnets in remainder at Central and Northern districts remained on base time.

FIGURE 6.

# SUBDISTRICTS OF THE COOK INLET CENTRAL DISTRICT

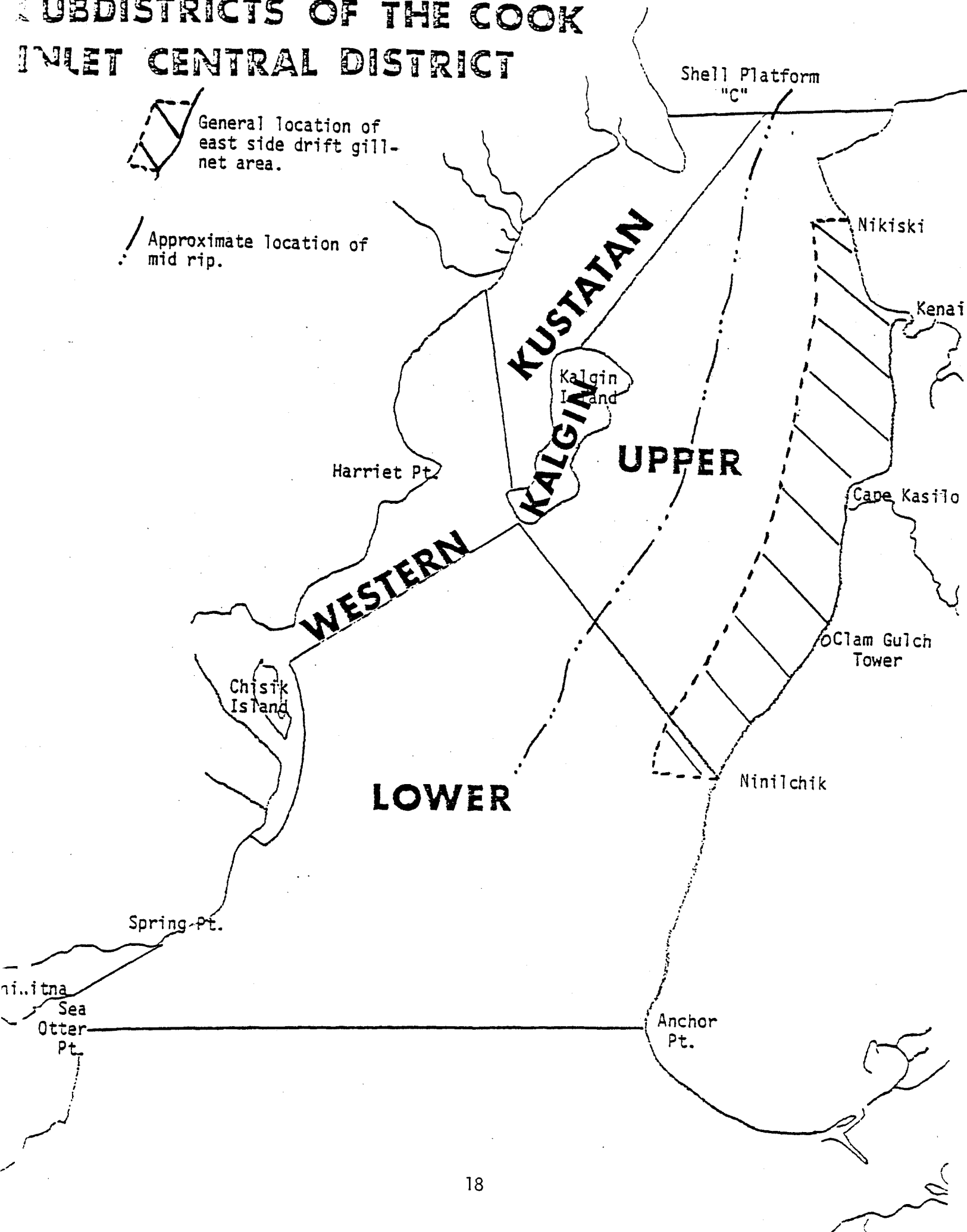


Table 3. Preliminary Upper Cook Inlet Commercial Salmon Catch, 1977.

Date	King	Sockeye	Pink	Chum	Coho	Total
6/27	812	43,437	1,692	131	7	46,079
6/29	740	52,126	3,022	941	16	56,845
7/1	710	65,769	6,174	1,659	29	74,341
7/4	969	80,755	14,041	4,771	52	100,588
7/6	111	6,495	438	180	9	7,233
7/8	1,070	195,963	39,052	17,336	252	253,673
7/11	686	355,685	58,962	13,911	1,023	430,267
7/13	648	350,763	56,377	21,928	3,790	433,506
7/15	1,067	177,166	76,913	21,202	7,117	283,465
7/16	1,392	63,001	32,608	2,994	628	100,623
7/18	878	128,087	73,262	21,806	8,319	232,352
7/20	642	131,365	27,129	11,991	5,427	176,554
7/21	794	111,537	32,806	20,208	6,142	171,487
7/22	36	8,651	19,600	1,012	3,459	32,758
7/23	486	119,873	44,886	124,937	19,115	309,297
7/24	618	55,027	15,745	54,321	9,893	135,604
7/25	335	40,663	16,855	55,171	9,629	122,653
7/29	477	24,842	17,090	277,012	42,696	362,117
8/1	393	5,849	4,111	197,295	24,456	232,104
8/5	196	4,513	3,248	118,501	11,535	137,993
8/8	139	988	756	73,110	8,360	83,353
8/10	12	498	453	65,807	2,842	69,612
8/12	55	492	302	44,319	3,792	48,960
8/15	39	306	145	36,055	4,048	40,593

Table 3. Preliminary Upper Cook Inlet Commercial Salmon Catch, 1977.

Date	King	Sockeye	Pink	Chum	Coho	Total
8/17	6	238	93	34,343	2,383	37,063
8/19	37	902	87	15,754	2,625	19,405
8/22	13	105	25	7,021	2,358	9,522
8/24	0	103	65	2,720	1,913	4,801
8/26	2	20	13	1,606	1,795	3,436
8/29	8	11	11	593	1,526	2,149
8/31	0	1	5	163	361	530
9/2	0	12	9	174	1,410	1,605
Total	13,371	2,025,243	545,975	1,248,972	187,007	4,020,568

during this period was very close to the peak with the drift catches dropping from the previous period and the set net catches on both east side Central district and Northern district increasing sharply. The sockeye were obviously leaving the drift fishing area and moving onto the beaches on their way to the rivers. Coho catches were beginning to pick up at this point. During the next period, Friday July 15, the sockeye catch dropped to 177,000 and the coho catch increased to 7,000. The time that coho would need to be considered in our management decisions was here. At this time, another factor arose to complicate matters. During July 15 and 16, a record number of sockeye were counted past the sonar counters in the Kenai River. One hundred and seventy five thousand sockeye, nearly half of our entire escapement goal, passed the counters during these two days. The escapement went from being comfortably close to the goal on July 14, to exceeding it on July 17. The Kasilof was very close to its escapement goal and the Susitna appeared to be doing quite well also. The problem was that all periods between July 15 and July 28 would have to be designed to protect coho and at the same time the sockeye still remaining in the fishing area - and there were plenty as it turned out - were surplus to escapement needs.

On July 16, to try to harvest the sockeye still out there and protect the coho, a 16 hour period was held for the east side set nets and the drift fleet restricted to within five miles from shore. The coho harvest from this period was minimal, another 63,000 sockeye was harvested. During the regular period on July 18, all areas fished but the fleet was restricted to the east side for 1/2 of the 12 hour period. One hundred and thirty thousand sockeye were taken during this period, most of them coming from the area around the shoal buoy south of Kalgin. The coho catch of 8,000 was relatively large with most of it coming from the area east of Kalgin. In view of the large sockeye catch, an extra 16 hour period was held for the east side set nets with the drift fleet

confined to the area south of the latitude of Clam Gulch tower. Towards the end of that period large numbers of sockeye were reported off the east side beach. To try to harvest these before they got into the river the east side was hastily opened to the drift fleet and a 16 hour period was announced for the following day, July 21, for east side set nets and the fleet confined to the east side. With the two periods back to back the harvest from the fleet and east side set nets was lost track of. In view of this it was decided to hold off fishing the fleet and the east side beach for the July 22 period. Set net fishing in other areas of the Inlet was allowed since it was a regularly scheduled period and this gear had not fished since the last regular period on July 18. During the two back to back periods on July 20 and 21 the fleet and east side set nets took 240,000 sockeye with the coho catch held to 13,000. In view of this harvest it was decided to hold a period on July 23 for the fleet and east side set nets because there were obviously still plenty of sockeye left to harvest. There was interest in relaxing the restrictions on the fleet a little bit during this period to get an indication of what kind of fish and how many were situated in the mid-Inlet. Therefore a 16 hour period was held on July 23 for east side for 4 hours and east of the mid-rip for 12 hours.

The results of this fishery were very interesting. One hundred and twenty thousand sockeye were harvested, many of them by the fleet fishing in the mid-rip area. One hundred and twenty five thousand chum and 20,000 coho were also taken, again mostly from the mid-rip area. It became evident then that the coho - what there was of them - were indeed where it was thought they would be and in the same area a large body of chums was located plus a fair number of sockeye.

It was decided then to let the chums go for awhile and try to pick up the last of the sockeye and still protect the coho as much as possible. On July 24 a 16 hour period was held for east side set nets and the fleet restricted

to the east side. On the regular scheduled period on July 25 the regular 12 hour period was held with set nets on the west side of the Northern district closed and the fleet restricted to the area south of the latitude of Cape Kasilof. The sockeye catches during the 24th and 25th were down and it appeared as though the run was nearly over. In view of this it was decided to hold off on all fishing until the regular period on July 29 and have no special restrictions during that period, hoping that the coho would have moved into freshwater by that time, as they normally do.

The July 29 period proved this not to be the case. The fleet took 35,000 coho which was almost as many as they had taken during all the previous periods combined. They also took 273,000 chums, a record single period catch. In view of the large number of chums involved located in the same area as the coho all that could be done at that point was hold off on fishing until the next regular period on August 1. To hold off beyond that would have run the risk of losing a large portion of a very large chum run, on the very slight chance that the coho would still be there. On August 1 the fleet did take 20,000 coho along with a harvest of 119,000 chum. On the next period, August 5, the fleet took 6,000 coho and it appeared as though the run had passed through.

That was the extent of the management for coho. Generally it centered around restricting fishing in the area where coho are known to concentrate. Due to the large size of the other runs it was necessary to allow a considerable amount of fishing around the concentration of coho. Unfortunately the coho remained in the fishing area much longer than they normally do. When fishing was finally allowed in the protected area to harvest other species large numbers of coho were taken and a satisfactory coho escapement was not achieved. Had the coho moved through the fishing area as they normally do the effort to maximize escapement might have been successful. However, the

other runs were affected by this management strategy, adversely for the most part, and this probably could not have been avoided. Major effects on the other runs were:

- 1) Because it was necessary to concentrate much of the drift fleet effort along the east side of the Central district to harvest surplus Kenai River sockeye, a much larger than average number of late run Kenai River king salmon were incidentally harvested by the drift fleet.
- 2) There was a less than adequate harvest of Kenai River sockeye salmon.
- 3) There was less than an adequate harvest of Susitna River pink salmon.
- 4) Although there was an adequate harvest of chum salmon it was necessary to delay the harvest of this species to protect intermingling coho. This resulted in a poor quality product when the chums finally were harvested.

For the remainder of the season the drift fleet and set nets in the Northern district concentrated on harvesting chums while set nets in the Central district fished mainly for late run coho. Beginning August 13 the fleet and set nets on the west side of the Central and Northern districts went to three 12 hour periods per week until the end of the season while set nets on the east side of the Central and Northern districts stayed with the base two 12 hour periods per week.

The chum fishery lasted through August 22 by which time the fleet and Northern district set nets had stopped fishing for the season. The coho fishery on the west side of the Central district continued to about September 15 and the east side Central district fishery continued into the first week in October.

The average harvest of late run coho from the east side of the Central district is about 13,000. Fishing time during this run has normally been three 12 hour periods per week with the effort reduced to between 60 and 80 nets as compared to the 500 or so that fish there during the sockeye run. This year the catches indicated a below average run so fishing time was kept to two 12 hour periods per week. This years effort was lower than normal with a peak count of 53 nets.

The harvest of late run coho in the east side set net fishery was slightly over 6,000. Because of the lower than average effort and the reduced fishing time this harvest probably does not indicate a total run of less than half the average.

Escapement. - There is a real paucity of escapement data for the Upper Cook Inlet area. Sonar counters are operated on the Kenai and Kasilof rivers and provide inseason escapement data on about 40% of the entire upper Inlet sockeye stocks. Inseason data on the rest of the sockeye and the entire runs of coho, pink, and chum are unobtainable. End-of-season index surveys are done on various clearwater streams in the Susitna River basin on sockeye, pink, coho, and kings to obtain an indication of escapement there. Escapement surveys are done on the few clearwater streams on the west side of the Central district to get an indication of coho and chum escapement in that area. Information on various escapement projects and programs can be found in the 1977 research technical report for Cook Inlet.

The overall escapement picture for 1977 is as follows:

Sockeye: Generally good to excellent. Escapement range for the Kasilof is 100,000-150,000. The 1977 escapement was 152,000. Escapement range for the Kenai is 200,000-400,000. The 1977 escapement was 780,000. Daily escapement counts for the Kenai and Kasilof rivers is given in Tables 4 and 5.

Table 4. Kenai River preliminary unapportioned sonar counts, 1977.

Date	North Bank	South Bank	Daily Total	Cumulative Total
June 21	925	776	1,701	1,701
22	768	639	1,407	3,108
23	617	729	1,346	4,454
24	478	493	971	5,425
25	655	721	1,376	6,801
26	1,003	1,286	2,289	9,090
27	670	919	1,589	10,679
28	661	782	1,443	12,122
29	584	1,185	1,769	13,891
30	776	1,156	1,932	15,823
July 1	603	1,228	1,831	17,654
2	781	856	1,637	19,291
3	614	1,112	1,726	21,017
4	807	1,200	2,007	23,024
5	1,757	1,386	3,143	26,167
6	3,054	1,253	4,307	30,474
7	2,806	1,293	4,099	34,573
8	3,222	1,572	4,794	39,367
9	2,065	1,539	3,604	42,971
10	6,870	2,877	9,747	52,718
11	25,093*	6,688	31,781	84,499
12	52,035	13,966	66,001	150,500
13	41,132	11,751	52,883	203,383
14	44,985	18,981	63,966	267,349
15	68,165	24,683	92,848	360,197
16	65,471	16,534	82,005	442,202
17	30,896	10,820	41,716	483,918
18	17,092	6,872	23,964	507,882
19	20,301	8,331	28,632	536,514
20	29,564	11,131	40,695	577,209
21	27,459	10,260	37,719	614,928
22	11,848	5,696	17,544	632,472
23	19,059	7,624	26,683	659,155
24	24,910	10,201	35,111	694,266
25	11,526	6,286	17,812	712,078
Total	519,252 .73%	192,826 .27%	712,078 100%	712,078

\* Counters down; line at interpolation.

Table 5. Kasilof River preliminary unapportioned sonar counts, 1977.

Date	North Bank	South Bank	Daily Total	Cumulative Total
June 20	154	0	154	154
21	135	0	135	289
22	229	50	279	568
23	399	32	431	999
24	323	69	392	1,391
25	593	63	656	2,047
26	665	93	758	2,805
27	245	44	289	3,094
28	707	36	743	3,837
29	1,267*	157*	1,424	5,261
30	1,827*	182	2,009	7,270
July 1	2,386	197*	2,583	9,853
2	1,736	212*	1,948	11,801
3	1,649	227*	1,876	13,677
4	1,848	242*	2,090	15,767
5	1,907	257*	2,164	17,931
6	3,579	272	3,851	21,782
7	5,917	197	6,114	27,896
8	6,182	387	6,569	34,465
9	3,419	312	3,731	38,196
10	5,795	446	6,241	44,437
11	9,996	998	10,994	55,431
12	7,990	1,193	9,183	64,614
13	9,244	2,332	11,576	76,190
14	6,361	2,321	8,682	84,872
15	7,017	2,532	9,549	94,421
16	10,362	1,580	11,942	106,363
17	6,097	1,416	7,513	113,876
18	3,830	1,138	4,968	118,844
19	2,169	556	2,725	121,569
20	1,968	2,293	4,261	125,830
21	2,724	1,220	3,944	129,774
22	1,401	828	2,229	132,003
23	1,355	1,138	2,493	134,496
24	1,440	1,682	3,122	137,618
25	1,604	880	2,493	140,102
26	1,204	696	1,900	142,002
27	2,111	555	2,666	144,668
28	749	493	1,242	145,910
29	2,202	487	2,689	148,599
30	1,486	397	1,883	150,482
31	645	280	925	151,407
August 1	697	268	965	152,372
2	1,130	216	1,346	153,718
3	692	261	953	154,671
Total	125,436 .81%	29,235 .19%	154,671 100%	154,671

\* Counters down; line at interpolation.

Susitna basin index surveys indicated the best escapement since the surveys began in 1972.

Coho: Index surveys, creel census, etc. on Northern district stocks indicate fair to poor escapement there. Very little is known on coho escapement of Central district stocks, however, the general impression is that coho escapement to most areas of the Central district was good.

Pink: The odd-year run to the Susitna basin is building. Pink salmon escapement in the Susitna in 1977 was the largest seen in recent years and was possibly more than necessary. The odd-year run to the Kenai-Kasilof systems has remained at the normal low level and pink escapement there this year was negligible.

Chum: The bulk of the chum production comes from the Susitna basin and very little is known about chum escapement there. The 1977 chum escapement to the Susitna was thought to be good. The west side of the Central and Northern districts accounts for most of the rest of the chum production here and although high muddy water precluded any escapement enumeration the escapement was thought to be good here also.

King: The only escapement work done on king salmon of possible interest to the commercial fishery is in the Susitna basin. The 1977 king escapement into the Susitna was estimated at about 120,000 which is considered excellent.

## HERRING FISHERY

### INTRODUCTION

Commercial herring fishing started in Cook Inlet in 1914 as a gillnet fishery in the Halibut Cove area of Kachemak Bay. The industry expanded rapidly and by 1925 there were a total of eight salteries in Cook Inlet - six of these in Halibut Cove, one in Seldovia and one in Port Graham. Gill-netting remained the chief method of catching herring until 1923 when purse seining was introduced. By 1927 the stocks were apparently depleted and it became uneconomical to fish the area. During the three highest years of production in Kachemak Bay, 1924 through 1925, the total annual harvest averaged about 8,000 tons. The average annual catch throughout the span of the active fishery in Kachemak Bay, from 1914-1928, was 2,850 tons.

The next major herring fishery to occur in the Cook Inlet management area was a purse seine operation for reduction purposes in the Day Harbor-Resurrection Bay area. The fishery started there in 1939 and lasted through 1959. The annual catch during the three highest years, 1944-1946, averaged about 16,500 tons while the average for all years of operation was 3,500 tons.

The present fishery in the Cook Inlet area began as purse seine operation in 1969, with a catch of 1,347 tons, and was initiated primarily to supply roe for the Japanese market. The herring are fished at a time when the roe is at its highest development which is immediately prior to spawning. The roe fishery in Cook Inlet runs from May through mid-June.

The catch from this fishery peaked in 1970 when 4,800 tons were taken, 2,700 from the Southern district and 2,100 from the Eastern district (see map, Figure 1, for district boundaries). The catch dropped in 1971 to 986 tons taken mostly in the Eastern district and to only 96 tons in 1972 with most of the catch again coming from the Eastern district. The large reduction

in the catches during 1971 and 1972 appears to be due to a combination of late, cold spring weather experienced in those years plus the possibility that the Eastern and Southern districts were overfished in 1970 and the stocks were reduced. Market problems also played a role in keeping the 1972 catch low.

In 1973, fair weather and a four-fold increase in price combined to produce a catch of 1,592 tons. The fair weather and good prices allowed fishermen to search for herring in areas that had rarely if ever been fished before. Fair concentrations of herring were located in several bays in the Outer district and in the Northern end of Kamishak district. A new fishery developed in the Central district where set gillnets were utilized.

Prior to the 1974 season a 4,000 ton quota was set for the entire Cook Inlet area. Good prices and fair weather continued in 1974 and a catch of 2,692 tons was achieved. Effort was again spread out and catches were made in all districts. Nearly 80% of the total catch was taken from the Kamishak district.

Analysis of the data collected during the 1974 season showed that the Kamishak district not only had the best quality herring but also the healthiest population. There appeared to be good numbers of herring in the area, spawning was plentiful and the harvest was well distributed through several age classes. Herring in the Eastern and Outer districts were lacking in quantity as well as quality with the harvest depending heavily on age four fish. Southern district herring were of good quality but hard to find and herring in the Central district were of poor quality, good for bait only, but plentiful. Almost all the harvest of 4,149 tons in 1975 and 4,849 tons in 1975 came from the Kamishak district. The only exception to this was the small bait harvest from the Central district. In 1976 about 3,500 tons of herring were spotted in the Southern district but they were too young to be of sufficient roe quality and no fishery was held.

During the 1976 season a deficiency in the age composition of the Kamishak herring became apparent. The 1971 and 1972 age classes were very weak. Since these age classes would normally be expected to produce a significant portion of the 1977 and 1978 harvest and would be contributing in lesser degrees to the harvest through 1981 it would be necessary to reduce the quota in the Kamishak district for the next few years to compensate for the expected deficiency.

Prior to the 1977 season the 4,000 ton quota was changed to a guide line harvest level to allow management more flexibility if large numbers of herring materialized. For the 1977 season the harvest level for the Kamishak district was set at between 2,700 and 3,000 tons to compensate for the weak 1971 and 1972 parent years. The harvest from other districts would depend on the show of herring to these areas.

1977 District Summary. - The fishery in the Kamishak district began this year on May 9. Samples taken during this fishery showed that the stocks being fished consisted of nearly 80% 3- and 4-year olds and that the recovery had begun to drop below desirable levels. The entire Kamishak district was closed 12:00 p.m. May 12 to wait for better quality fish to materilize. Two hundred seventy-five tons of herring were harvested from Iniskin Bay prior to this closure. Forty-five seiners and twenty-six tenders participated in the fishery.

Several samples were taken from the Bruin Bay-Rocky Cove area on May 13. The herring showed good recovery and favorable age structure and appeared to be moving into the area in sufficient quantity to warrant a fishery. The Kamishak Bay district south of Ursus was opened to herring fishing at 12 noon May 14. Approximately 700 tons of herring were harvested from Bruin Bay on May 14. A great number of submerged rocks in the area caused many torn nets and prohibited a greater harvest. Favorable weather on May 15 permitted an

additional 1,200 tons to be harvested from Bruin Bay. Although some spawning began taking place, the overall quantity and quality of the fish remained good so the area was left open pending further notice.

The Kamishak district was closed at midnight May 17 as large areas of spawn began appearing and the recovery started to drop. Few additional fish were harvested after May 15 due to unfavorable weather.

Aerial surveys of Kamishak district on May 20 and 24 revealed no visible sign of herring. On May 26 good numbers of herring were observed moving into the Oil Bay area. Favorable recovery rates and age structure were found in these fish and it was decided to open that area to fill the remaining 800 tons left on the quota. The portion of Kamishak district east of the longitude of Scott Island and north of the latitude of South Head excluding the waters of Iniskin Bay were opened to herring fishing from 6:00 a.m. to 10:00 a.m. May 29. No herring were taken due to adverse weather. The fishery was reopened at 6:00 p.m. May 29. The fishing was very slow because the storm had pushed most of the herring out into deeper water. Only 30 tons were harvested on the 29th. Fishing again started out slow on May 30 but increased by evening. Approximately 170 tons were taken. Relatively calm weather prevailed and the herring began to move back into the fishing area in ever greater numbers. The fishery remained open in the Oil Bay area until midnight May 31 by which time the remaining 600 tons were taken. A total of 53 seiners and 38 tenders participated in the Kamishak herring fishery and 2,881 tons were taken.

There was a fishery in the Southern district this year. The district had been closed on April 15 along with the Eastern and Outer district. An aerial survey of the Southern district on May 13 revealed approximately 3,500 tons of herring scattered along the south side of Kachemak Bay. A sample showed that they were mostly young fish, 3- and 4-year olds, but that they yielded a good recovery. It was determined that a limited harvest was justified

and the Humpy Creek subdistrict of the Southern district was opened for two hours on May 14. Two hundred seventy-six tons of herring were harvested during this fishery with 16 seiners and 7 tenders participating. Subsequent surveys of the area did not reveal any other concentrations of herring and the Southern district stayed closed for the remainder of the season.

Surveys in the Eastern and Outer districts did not reveal sufficient quantities of herring to warrant fishing so these areas remained closed all season.

There was a limited bait fishery in the Central district again this year and 17 tons were harvested.

Table 6 lists the comparative annual district catch with vessels and landings since 1969. With the institution of limited entry in the herring purse seine fishery a ceiling of 68 units of purse seine gear has been set for the Cook Inlet fishery.

Table 6. Cook Inlet herring catches 1969-1976.

		<u>Tons</u>	<u>Landings</u>	<u>Vessels</u>
1969	Southern	551.5	41	5
	Outer	38.0	1	1
	Eastern	757.9	32	7
	<u>TOTAL</u>	<u>1347.4</u>	<u>74</u>	<u>11</u>
1970	Southern	2708.7	104	11
	Eastern	2100.2	81	11
	<u>TOTAL</u>	<u>4808.9</u>	<u>185</u>	<u>18</u>
1971	Southern	12.5	4	3
	Eastern	974.0	129	20
	<u>TOTAL</u>	<u>986.5</u>	<u>133</u>	<u>23</u>
1972	Southern	1.0	1	1
	Eastern	95.0	14	5
	<u>TOTAL</u>	<u>96.0</u>	<u>15</u>	<u>6</u>
1973	Southern	203.8	20	12
	Outer	300.5	19	7
	Eastern	830.8	53	22
	Kamishak	243.1	33	9
	Central	14.0	15	6 (set net)
	<u>TOTAL</u>	<u>1592.2</u>	<u>140</u>	<u>30</u>
				6 (set net)
1974	Southern	110.2	20	7
	Outer	390.1	91	22
	Eastern	47.4	18	10
	Kamishak	2108.0	127	26
	Central	36.6	58	12 (set net)
	<u>TOTAL</u>	<u>2692.3</u>	<u>314</u>	<u>42</u>
				12 (set net)
1975	Southern	24.0	9	5
	Kamishak	4119.0	294	39
	Central	6.0	11	1 (set net)
	<u>TOTAL</u>	<u>4149.0</u>	<u>315</u>	<u>44</u>
				1 (set net)
1976	Kamishak	4836.6	422	72 (purse seine)
	Kamishak	6.12	1	1 (set net)
	Central	5.9	7	4 (set net)
	<u>TOTAL</u>	<u>4849.0</u>	<u>430</u>	<u>77</u>
				5 (set net)
1977	Kamishak	2881.0	337	53 (purse seine)
	Central & North.	17.3	57	(set net)
	Southern	276.0	21	16 (purse seine)
	<u>TOTAL</u>	<u>3174.3</u>	<u>604</u>	

## OTHER FISHERIES

### RAZOR CLAMS

The razor clam fishery began in Cook Inlet in 1923 in the Polly Creek area. Very little is known of the fishery through 1945 except that it was sporadic with Polly Creek and Ninilchik the main harvest areas.

From 1945 to 1949 production was light, less than 10,000 lbs. annually. For 1950 and 1951 production increased to over 300,000 lbs. annually. There was no production at all from 1952 through 1960.

Operations began again in 1961. In 1959 the Ninilchik area was closed to commercial digging so all production was now coming from the Polly Creek area. The fishery continued at Polly Creek through 1963. The 1961 harvest was almost 300,000 lbs., the 1962 harvest about 176,000 lbs. and in 1963 the harvest dropped to about 7,000 lbs. From 1964 through 1970 no commercial harvest occurred. The 1971 season had a harvest of 15,000 lbs. and 1972 and 1973 had harvests of 30,000 lbs. and 34,000 lbs. respectively. There has been no commercial razor clam harvest since 1973.

The sporadic nature of the razor clam fishery here is more closely related to demand than to supply. Through 1951 the main problems were getting diggers to the clam beaches and the clams to the processor. In 1954 the State of Alaska was expelled from the National Shellfish Council, the national regulatory body for shellfish, which meant that clams could no longer be shipped out of state for human consumption. This left only a sporadic bait market and a very small in-state human consumption market that needed to be supplied. The State was readmitted to the National Shellfish Council in 1973, however, tight harvesting regulations and the expense involved with digging clams is keeping a lid on production. The entire west side of Cook Inlet is open to commercial fishing, however, a three mile area of Polly Creek is the only place where razor clams may be

harvested for human consumption. The rest of the commercial fishing area is for bait only.

Through 1971 virtually all clams in Cook Inlet were hand dug. The cost currently involved with hand digging have made it an unprofitable method of harvesting razor clams. Since 1972 there have been several attempts to perfect a mechanical or hydraulic means of harvesting them. Razor clams for several reasons are not very amenable to digging with a machine. Machine digging operations are very tightly controlled and to date no attempt has been successful. There is currently a good market for razor clams and if a satisfactory digging machine is ever perfected a steady fishery will develop. Until that time no significant commercial harvest can be expected in Cook Inlet.

#### SUBSISTENCE

Salmon, herring, and smelt are the three subsistence fisheries known to take place in the Upper Cook Inlet area. The subsistence salmon season currently runs from July 30 to September 21 in the Northern district and August 16 to December 31 in the Central district. Fishing is restricted to those areas open to commercial fishing and allowed only during open commercial fishing periods. Set and drift gillnets are the only gear allowed with the maximum allowable amount of gear being 150 fathoms of drift gillnet 45 meshes deep or 105 fathoms of set gillnet 45 meshes deep with no single net being longer than 35 fathoms, the same as the commercial fishery. A permit is required and each permit holder is allowed a maximum of 50 salmon.

Table 7 gives the subsistence salmon catch for the Upper Cook Inlet area since 1971. An average of 87 permits are issued annually with the high being 123 in 1973 and a low of 37 in 1971. The average catch is 397 salmon with a high of 764 in 1975 and a low of 101 in 1972. Since coho is the principal species running during the subsistence season they make up the majority of the harvest. Over 80% of the catch is coho salmon.

Table 7. Upper Cook Inlet subsistence fishery by district, 1971-1977.

1971 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern			10			10	9	8
Central			138			138	28	23
Total			148			148	37	31

1972 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern		4	23	10	15	52	9	7
Central		--	32	17	--	49	21	19
Total		4	55	27	15	101	30	26

1973 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern		24	104	3	37	168	19	17
Central		11	228	9	--	248	104	73
Total		35	332	12	37	416	123	90

1974 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern	--	13	27	--	1	41	12	8
Central	1	1	264	17	1	284	97	73
Total	1	14	291	17	2	325	109	81

Table 7. Upper Cook Inlet subsistence fishery by district, 1971-1977.

1975 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern	--	--	68	--	14	82	17	12
Central	1	4	591	8	78	682	97	85
Total	1	4	659	8	92	764	114	97

1976 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern		6	111	24	5	146	21	13
Central		15	456	89	8	568	90	67
Total		21	567	113	13	714	111	80

1977 Catch by Species

District	King	Sockeye	Coho	Pink	Chum	Total	Permits Issued	Permits Returned
Northern	--	2	17	--	12	31	10	6
Central	2	11	224	1	44	282	73	30
Total	2	13	241	1	56	313	83	36

Average	.5	13	327	25	31	397	87	63
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The smelt and herring fisheries occur coincidentally during the month of May. These fisheries are closed by regulation on June 1 to reduce the incidental catch of salmon. Both fisheries utilize set gillnets that may not exceed 50 feet in length (20 feet in the Kenai River) with a maximum mesh size of 2 inches.

The bulk of the smelt subsistence fishery takes place in the lower portion of the Kenai River. The remainder occurs along the beaches mostly on the east side. No permit is required for smelt subsistence fishing so there is no record of the annual take.

The herring subsistence fishery occurs mainly along the east side beaches of the Central and Northern district. Again no permit is required so there is no record of the harvest. However, in 1975 a survey was conducted on both the herring subsistence and commercial gillnet fishery along the east side of the Central district. That year the subsistence take was about eight tons. Most of these fish were used as fertilizer for home gardens.

## FUTURE MANAGEMENT PLANS AND RECOMMENDATIONS

### SALMON

1978 Anticipated Run. - Formal salmon run forecasts are not made for the Upper Cook Inlet area. The following are projections for the 1978 return based mainly on brood year escapements:

Sockeye: The 1978 season will be largely dependent on the 1973 brood year. Sockeye escapements to the Kasilof and Susitna systems were low in 1973 and consequently below average runs are anticipated to these systems next year. Escapement to the Kenai system was good in 1973, however, analysis of the 1977 escapement revealed an unusually low number of 4-year olds. Normally, a low number of 4-year olds in the escapement presages a low run of 5-year olds the following year. Therefore, this years run to the Kenai may be lower than the principal brood year escapement would indicate.

Pink: The 1978 return will depend almost exclusively on the 1976 brood year. Escapement was excellent in 1976 and good returns are expected.

Chum: The return is expected to be below average.

Coho: Brood year (1974) escapement to the Northern district was fair to poor and consequently a below average return is expected. Brood year escapement to systems in the Central district appeared normal and the 1978 return is expected to be about average there.

Management Strategy. - At the fall 1977 Board of Fisheries meeting a comprehensive salmon management policy for Upper Cook Inlet was adopted for guiding the management not only in 1978 but possibly well into the future. The policy reads as follows:

The dramatically increasing population of the Cook Inlet area has resulted in increasing competition between recreational and commer-

cial fishermen for the Cook Inlet salmon stocks. Concurrently, urbanization and associated road construction has increased recreational angler effort and may adversely affect fisheries habitat. As a result the Board of Fisheries has determined that a policy must now be determined for the long-term management of the Cook Inlet salmon stocks north of Anchor Point. This policy should rest upon the following considerations:

1. The ultimate management goal for the Cook Inlet stocks must be their protection and, where feasible, rehabilitation and enhancement. To achieve this biological goal, priorities must be set among beneficial uses of the resource.
2. The commercial fishing industry in Cook Inlet is a valuable long-term asset of this state and must be protected, while recognizing the legitimate claims of the non-commercial user.
3. Of the salmon stocks in Cook Inlet, the king and silver salmon are the target species for recreational anglers while the chum, pink, and red salmon are the predominant commercial fishery.
4. User groups should know what the management plan for salmon stocks will be in order that they can plan their use consistent with that plan. Thus, commercial fishermen must know if they are harvesting stocks which in the long-term will be managed primarily for recreational consumption so that they may plan appropriately. Conversely, as recreational demands increase the recreational user must be aware

of what stocks will be managed primarily for commercial harvest in order that he not become overly dependent on these fish for recreational purposes.

5. Various agencies should be aware of the long-term management plan so that salmon management needs will be considered when making decisions in areas such as land use planning and highway construction.
6. It is imperative that the Department of Fish and Game receive long-range direction in management of these stocks rather than being called upon to respond to annually changing Board directives. Within the Department, divisions such as FRED, must receive such long-term direction.

Therefore, the Board established priorities on the following Cook Inlet stocks north of Anchor Point. In so doing it is not the Board's intent to establish exclusive use of the stock; rather its purpose is to define the primary beneficial use of the stock while permitting secondary uses of the stock to the extent it is consistent with the requirements of the primary user group.

- A. Stocks which normally move in Cook Inlet to spawning areas prior to June 30, shall be managed primarily as a non-commercial resource.
- B. Stocks which normally move in Cook Inlet after June 30, shall be managed primarily as a non-recreational resource until August 15; however, existing recreational target fish shall only be harvested incidental to the non-recreational use; thereafter stocks moving to spawning areas on the Kenai Peninsula shall be managed primarily as a non-commercial resource. Other stocks

shall continue to be managed primarily as a non-recreational resource.

- C. The Susitna coho, the Kenai king, and the Kenai coho runs cannot be separated from other stocks which are being managed primarily as non-recreational resources; however, efforts shall be made, consistent with the primary management goal, to minimize the non-recreational catch of this stock.

Management strategy will obviously have to change to accommodate this policy. During those portions of the season when recreational fishermen have preference the commercial fishery will have to take a back seat. This means that the newly allowed commercial fishery on the Susitna king salmon run will be able to continue only if it can be established that it does not impact the recreational fishery and that will be almost impossible to establish. The fishery on the late Kenai River coho run will also be affected. The Board has adopted a policy stating that this fishery can take place only if there is an average or better run, and that no more than two 12 hour periods per week are allowed. The size of the run will need to be determined by comparative analysis of the commercial catch and the determination will be quite subjective. Additionally it may prove difficult to allow a commercial fishery during the recreational preference period on fish of little recreational interest if their harvest would also result in significant catches of recreational stocks.

On the other hand during the time favoring the commercial fishery the primary concern should be with the timely harvest of surplus sockeye, pink, and chum. Efforts should be made to minimize the commercial harvest of kings and coho but not at the expense of the commercial stocks. Along this line, it is this writers opinion that the late Kenai River king salmon stock will

become the next "problem child." Recreational pressure is increasing dramatically on this stock and unless something is done to reduce the pressure there will be problems with or without the commercial fishery. In view of this and the trophy nature of these fish it is not too soon to begin considering various management options for minimizing their harvest in the commercial fishery. The bulk of the commercial harvest of Kenai kings comes from the east side Central district set net fishery.

The early Kenai coho run will only be impacted on even years when the Kenai-Kasilof pink run occurs. During this pink run there is very little that can be done to help the coho without affecting the pinks since the stocks are heavily intermingled.

It is very difficult to do much preseason strategy planning since not much is known about the return. If the runs do come back as outlined above there could be the prospect of needing to harvest a large surplus of pinks and protect intermingling sockeye, chum, and coho. In view of this it may be necessary to institute the 4 3/4 inch maximum mesh size regulation during whatever time may be necessary to harvest pinks. This may not do much to protect coho but it could be effective in reducing the catch of chum and sockeye. If this regulation is used fishermen should be given as much advance notice as possible. Also the amount of gear involved in these fisheries should be restricted as much as possible if the sockeye and chum runs are light. During the Susitna pink run the east side set net fishery should be excluded unless there are large numbers of these pinks being taken on the beach. During the Kenai-Kasilof pink run the fleet could probably be excluded as most of these fish normally travel along the beach.

#### HERRING

Virtually no research on stock size, origins, etc. is currently being done on the Cook Inlet herring stocks. Consequently the size of the spawning

stocks is not known and therefore the correct level of harvest is unknown. This is the biggest problem facing the management of this fishery and where the Department loses a lot of credibility. However, even if research were begun immediately the answers would be a long time in coming due to the nature of the area. In the meantime we must assume that 4,000 tons is the proper harvest level for Kamishak stocks with a normal age structure and operate conservatively in the Southern district where stocks are staging a come-back.

The gear limit imposed by the Commercial Fisheries Entry Commission should pose no problem in managing the fishery. Using the 4,000 ton level to key the harvest off of in the Kamishak district, all that is necessary there is to be on the grounds, insure that the stocks being fished on are of sufficient roe quality, protect actively spawning fish and close the fishery when the desired harvest level is achieved. In managing the Southern district it will be necessary to determine as nearly as possible the size of the stocks, then, if these fish are of sufficient roe quality, allow a harvest of about 10%-15% of the estimated volume. Determining numbers of fish is very subjective so it is best to be conservative in nature. It doesn't appear as though there ever was much in the way of herring in the Outer district and there probably won't be in future. If stocks in the Eastern district begin to come back the same type of management should apply there as in the Southern district unless something better comes along.

Comparative age composition for the Kamishak district is presented graphically in Figure 7. As expected during the 1977 season the 5- and 6-year olds were deficient. It is very probable that these age classes will be deficient again in 1978 as 6- and 7-year olds so it will again be necessary to reduce the quota to compensate. Six- and seven-year olds normally make up 20%-25% of the harvest so it would be necessary to reduce the quota by about that much.

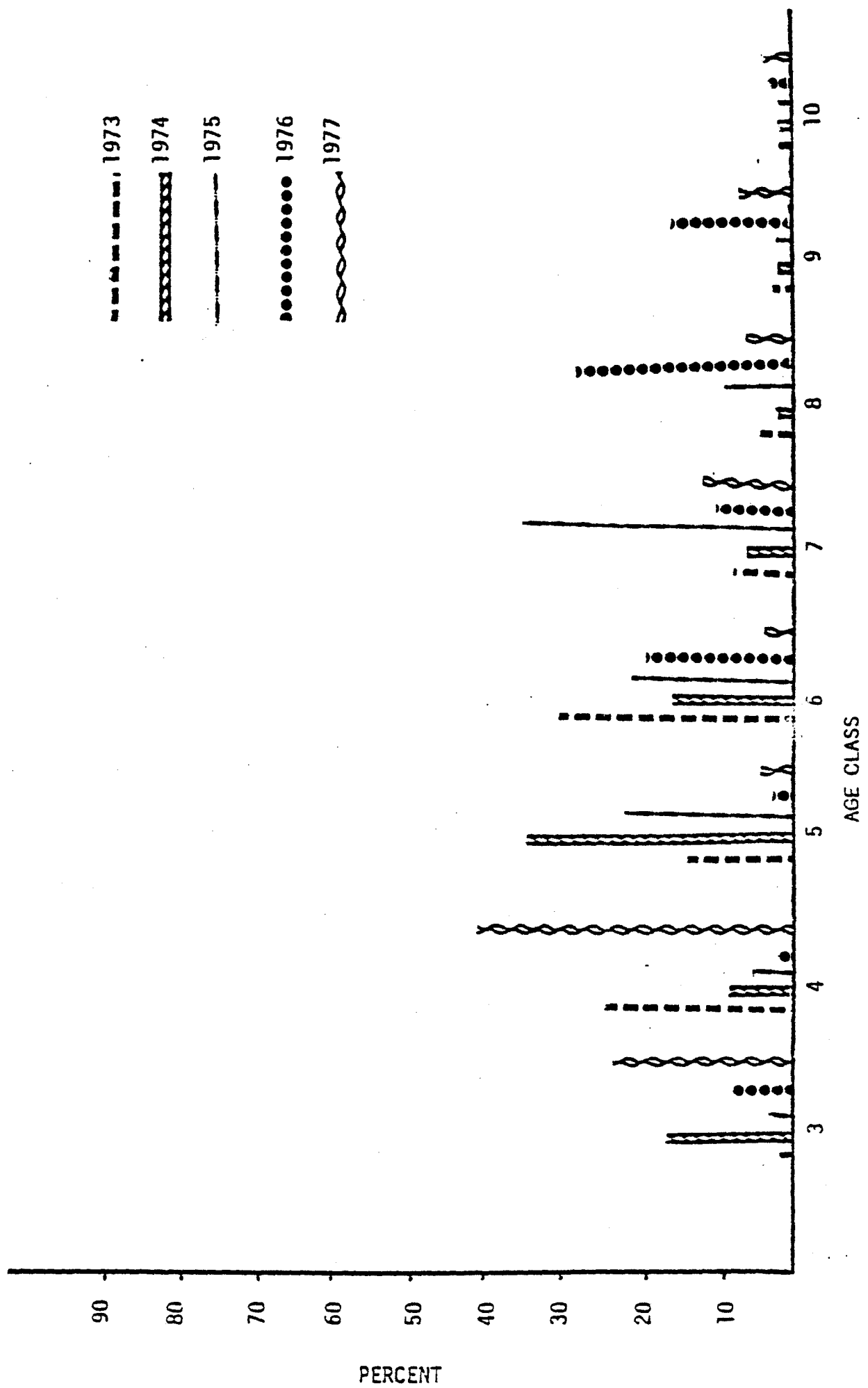


Figure 7. Kamishak District Herring Age Composition

## RAZOR CLAMS

The only work currently being done on razor clams is sampling the human consumption area at Polly Creek for traces of paralytic shellfish poisoning (PSP). This is conducted twice monthly from April through September. The sampling must be done if the beach is to remain a commercial human consumption area. A population study was initiated at Polly Creek in 1973 in conjunction with the PSP sampling but was suspended due to lack of funding. There is some possibility that the PSP sampling will be suspended due to lack of funding.

If a commercial fishery develops in Cook Inlet using machines the biggest problem will be controlling harvest. Proper control of the harvest requires knowledge of population size, age structure, and life history. To date very little information has been gathered on any of these. It is difficult to justify razor clam work when there is no fishery and money is tight. However, if a commercial fishery appears imminent attempts should be made to begin gathering this information as quickly as possible.

## SUBSISTENCE

Subsistence fishing under the current regulations is very minor in Upper Cook Inlet. Unless the regulations are made more liberal no significant increase in the harvest is anticipated. In view of this no change in the current passive management is recommended.

It is recommended, however, that a complete review of the subsistence regulations be undertaken with the view of cutting them loose from the commercial sections and simplifying them. No changes in intent are recommended, just make them easier for an individual to follow.

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